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Coccidiosis—Some Factors Influencing its Epidemiology

By

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The term coccidiosis is an all-embracing one which is used to cover a considerable number of different pathological conditions produced by members of the genera *Isospora* and *Eimeria*. Among domestic animals *Isospora* is responsible for coccidiosis in dogs and cats and *Eimeria* is the causal organism of coccidiosis in domestic fowls, geese, turkeys, rabbits, sheep and cattle. The genus *Eimeria* is of considerable economic importance in this country and frequently gives rise to serious losses among farm stock. It may well be that as our knowledge increases we shall find that the coccidia are of even greater importance than is generally realized.

Different species of *Eimeria* produce different types of coccidiosis and several species may often occur at the same time in the same host with or without the production of disease, *e.g.*, *E. zurnii* and *E. bovis* in calves, *E. stiedae*, *E. perforans* and *E. magna* in rabbits, and *E. tenella*, *E. necatrix* and *E. brunetti* in chickens. The various species of *Eimeria* are almost always host-specific and different pathogenic species within the same host may set up conditions of disease in different sites. The species of *Isospora* appear to be less rigidly host-specific. The coccidia also include a number of benign parasites like *E. acervulina*, *E. mitis* and *E. praecox* in fowls. Although the coccidium is usually a parasite of the intestinal wall some species parasitize other organs, *e.g.*, *E. stiedae* in the liver of the rabbit and *E. truncata* in the uriniferous tubules of the gosling kidney. Whatever the habit of the coccidia, their life-cycles are similar in that they pass through one or several asexual phases and a sexual phase within the host and all terminate their endogenous cycle with the production of sexually produced cysts which are passed to the exterior. The relative times taken to pass through these various phases differ in different species.

Before the oocyst can become infective to another host it must undergo a process of sporulation outside the host. Under optimum conditions the times that are necessary for the completion of sporulation may vary between different species. Oocysts are resistant to wide extremes of temperature. The optimum temperature for sporulation in *E. tenella* lies between 28° and 30° C. and it has been found that oocysts may remain viable, though unsporulated, at temperatures near freezing point. At slightly higher temperatures the process of sporulation proceeds slowly. Sporulated oocysts exposed in sheltered out-of-door situations in an average year have proved infective to susceptible chickens after 14 months. At very low temperatures of severe winters, *i.e.*, at 15 to 20° of frost, the mortality among oocysts is high.

Both unsporulated and sporulated oocysts are extremely sensitive to desiccation. For normal viability and development over a period of 48 hours (in *E. tenella*) the relative humidity must exceed 90 per cent. At 93·5 per cent. (as calculated from readings of a wet- and dry-bulb thermometer) it was found that 69 to 72 per cent. of freshly passed oocysts sporulated and even at this high humidity some were distorted, although the spores appeared normal and infection experiments showed them to be viable. Control oocysts maintained in a saturated atmosphere showed a sporulation value of 83 per cent. Collapse and frequently fracture of the oocyst wall as evidenced by the passage of stains into the sporablasts of sporulating oocysts, and disintegration of the cyst contents were observed at relative humidities of less than 70 per cent. Under natural conditions, where oocysts are distributed in the moisture of faeces, the humidity of their environment is never below saturation point. At the onset of disease the faeces become extremely moist and remain so until the oocysts are discharged by those birds which survive the seventh day. In practice, one of the control measures is to keep chicken pens as dry as possible. A knowledge of the operation of the factors of temperature and moisture is of considerable importance in helping us to elucidate some of the problems associated with the epidemiology of coccidiosis. These remarks apply to coccidia in general. In Great Britain most of the experimental work on the epidemiology of coccidiosis has been carried out with the caecal form of the disease in chickens caused by *E. tenella*.

The enlarged distal portions of the chicken's caeca are the parts which are most severely affected, the rapid growth of the second generation schizonts apparently being responsible for the collapse of the epithelial layer, the tunica propria and sub-mucosa. Severe haemorrhage results and the flow of blood into the lumen of the caeca carries many merozoites with it. On the fifth day of infection, when most severely infected chickens die, much of the mucosa has sloughed.

Passing now to the epidemiology of caecal coccidiosis, we have no certain evidence of variations in the virulence of different strains and it seems that the explanation for an occasional appearance of disease is not merely to be found in the new introduction of a virulent parasite to a previously infected flock but in something quite different and possibly much more complicated and associated with the whole ecology of the parasite and its host.

The influence of temperature and moisture on the sporulation of oocysts affords a starting point for the investigation, as we have seen that these factors are mainly responsible in regulating the number of infective oocysts ingested by chickens. It is possible to obtain a picture of the effects of different initial infections on the course of subsequent infections by feeding to the survivors of the initial infections and susceptible chicks the oocysts derived from the initial infections and comparing the mortality figures in the different groups.

Infected chickens which are strictly isolated from any possible reinfections will eventually rid themselves of parasites by forming and discharging oocysts. Chickens which are not so isolated, however, are constantly reinfecting themselves, with the result that almost every healthy chicken existing under natural conditions carries coccidia. As one ingested oocyst may produce many hundreds more it will be appreciated that hosts carrying sub-clinical infections produced by the continual picking up of small numbers of sporulated oocysts are the reservoirs of the protozoan. Various workers have investigated the matter of early sub-clinical infections. A strong immunity is developed to caecal coccidiosis although its nature has yet to be determined.

Caecal coccidiosis normally occurs in chickens ranging in age from four to six weeks, but provided that older birds are strictly isolated from any infection or are exposed only to very low-grade infections by *E. tenella* it is quite simple to produce in them acute infections with this species. For example, a group of 30 six-months-old cockerels was maintained in an isolation unit from hatching and regular examinations of their faeces both by floating technique and the feeding of cultured faecal samples to susceptible chicks showed them to be completely free of coccidia. A single sporulated oocyst was fed to one of these birds and within five weeks the whole group had succumbed to acute caecal coccidiosis. It appears that age of bird alone does not produce an immunity against *E. tenella*. The fact that epidemics of caecal coccidiosis are not commonly met with among mature stock is due to the immunity gained from previous sub-clinical infections. As fowls carrying light infections show no symptoms, and as the number of oocysts ingested determines the severity of the disease in susceptible chicks, and if there is a gradual and progressive intake of oocysts, as is possible under farm conditions, it is obvious that a basis is provided for the development of resistance.

That the magnitude of a single dose of oocysts plays an important part in determining the course of an epidemic is shown by the following example: Five different groups of 100 chickens each were dosed with 120,000, 60,000, 30,000, 200 and 100 sporulated oocysts per chicken respectively. As a result of these doses, 50 of the group receiving 120,000 oocysts, 25 of the group receiving 60,000 oocysts and 25 of the group receiving 30,000 oocysts, died from acute caecal coccidiosis. No deaths occurred in the groups receiving 200 and 100 oocysts. At the end of three weeks the survivors of these groups and a group which had received no previous infection were fed equal and very large doses of oocysts derived from the survivors of the initial doses. The results are summarized diagrammatically in Figure 1.

* As read at the Meeting of the British Association for the Advancement of Science, Dundee, 1947.

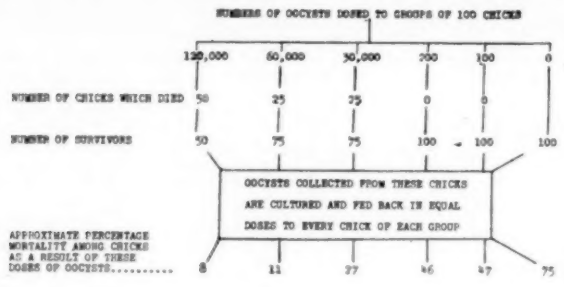

FIGURE 1

Although the same number of deaths resulted in the 60,000 and 30,000 groups in the first instance, on the repeat dose almost three times as many died in the 30,000 group. It is also of interest that even at low doses (200 and 100) some degree of protection is afforded. From these figures it is evident that the degree of resistance is dependent on the magnitude of the infections which, under natural conditions, is regulated by a variety of circumstances which include the crowding of chickens, hygiene and the temperature and humidity of the oocyst environment. It follows that chickens maintained under conditions of almost complete isolation from coccidia will become susceptible to any introduced infections, and this is often the explanation of the sudden appearance of acute caecal coccidiosis among chicks, especially when transferred to out-of-door units, reared under conditions of strict sanitation and on wire floors.

From the above figures it will be realized that there must be a dosage of oocysts which will not produce deaths but will tend to induce immune responses in chickens, but in practice it is impossible to adjust the oocyst intake accordingly. If, however, by therapeutical means the losses resulting from the initial infection might materially be reduced and yet permit of the intracellular development of the coccidia to a stage which stimulates immune responses in the host, a means of immunizing chickens would be practicable. That this is possible is shown by work at Weybridge which has demonstrated three sulphonamides (sulphadiazine, sulphamezathine and sulphapyrazine) which actually attack the parasites in the host cells.

In acute caecal coccidiosis chickens usually succumb to the disease on the fifth day, *i.e.*, two days prior to the production of oocysts. If sulphamezathine is administered to the chickens so that a blood level of 5 to 10 mg./ml. is attained by the fourth day, and is maintained over the fifth day, the chickens will usually survive an infection of any tested magnitude; this concentration must be reached before the second generation schizonts are formed, as these stages appear to be the ones susceptible to treatment and those which, in the absence of treatment, would undergo normal nuclear division and segmentation into merozoites with the consequent death of the host. The second generation schizont also appears to be the stage which stimulates immune responses in the host. The action of effective sulphonamides on the schizont is to inhibit merozoite formation and death of the host appears to be related in some way to the mass extrusion of merozoites. These effects of treatment with the effective sulphonamides are dealt with diagrammatically in Figure 2.

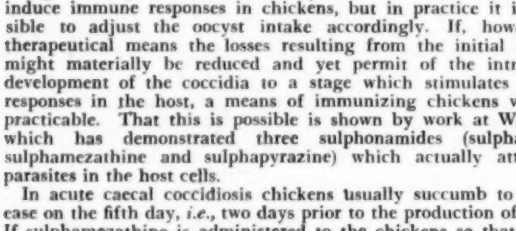

FIG. 2

Treatment with sulphonamides is essentially a flock treatment as there is no way of diagnosing the disease in individual chickens until it is too far advanced to treat successfully. In the natural epidemic several chickens in a flock show symptoms before the others and then is the time to treat these and all birds in contact with them. By these means mortality can be reduced by 70 to 90 per cent. and usually all survivors are resistant to further acute infections.

A study of the epidemiology of caecal coccidiosis shows very clearly that it is undesirable to try to maintain chicks free of infection: the aim should rather be one of controlling the intake of oocysts so that birds are constantly picking up small doses of them throughout life. Coccidiosis in chickens provides an excellent example of the group of diseases caused by parasites of ubiquitous distribution. In this group of diseases it is preferable to maintain the resistance of the host group by permitting an ever present low-grade infection than to endeavour to prevent infection and thereby to retain the susceptibility of the host group.

Swine Erysipelas in Kenya

By

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Swine erysipelas is cosmopolitan in distribution and exists in countries as widely separated as America, the continent of Europe, Japan and Australasia. It is surprising, therefore, that so little is heard of the disease in the continent of Africa. Merchant (1942) mentions its existence in North Africa and Haig & Adelaar (1944) report for the first time a single case in the Union of South Africa. It is unknown in the Sudan, Uganda and Northern Rhodesia. In Tanganyika Territory it has been suspected on two occasions but has never been confirmed.

In Kenya, prior to 1946, swine erysipelas had been suspected on one or two occasions, without ever being confirmed. In July of that year, however, its existence was placed beyond doubt following the submission to the laboratory of material from pigs that had died in two different areas. One case was examined by the writer and the other by a colleague (Fitzpatrick, 1946). It was a strange coincidence that the discovery of the disease should have been made, for the first time, in the same week, by two officers working independently of one another, particularly as it transpired that these two cases were not the precursors of large-scale outbreaks. In point of fact, only one other case has been confirmed since that date.

History

The material received by the writer was a heart, without preservative, from an eight-months-old, pure-bred, Wessex Saddleback boar. This pig was bred in the colony and purchased by the owner as a ten-weeks-old weaner. It lived, thereafter, in a sty by itself and thrived until a few days before its death when it was observed to be listless and stiff in the hind-quarters. On July 30th, 1946, a few hours after feeding normally, it was found dead. The owner performed a *post-mortem* examination but noticed only a pericarditis, an enlarged liver and "green markings on the kidneys."

The heart showed vegetations, up to a grape in size, of a rather friable nature, on the right auriculo-ventricular valves. Slides made from the junction of the vegetations with the valves showed very small, thin, straight, Gram-positive rods, and a few thread-like, granular forms. Sections made from the vegetations showed them to be of a typical thrombus character, structureless, but with a distinct fibrous matrix containing exudate and blood cells, although no organized blood vessels were observed. The organism was recovered without difficulty in pure culture after 24 hours' incubation at 37° C. by inoculating material from the vegetations into serum broth and on to agar and blood agar slopes and plates.

Bacteriology

Agar Plate.—When inoculated from the valvular lesions, minute, round, transparent, convex, dewdrop colonies developed after 24 hours' incubation at 37° C., composed of small, straight, slender, Gram-positive rods measuring about 1·0μ long and 0·3μ broad. After 24 hours' further incubation a slight but definite increase in size of colonies was noted. By the fourth day many of the colonies became rough and measured up to 0·8 mm. in diameter. Colonies were easily emulsifiable but not butyrous. When agar plates were inoculated from the heart of a pigeon which had died as a result of erysipelas artificially induced, colonies grew as described above, but when agar plates were inoculated from a pure broth culture, or from a single, smooth, young colony on another agar plate, no growth occurred.

Blood Agar Plate.—When inoculated either from animal tissues or from serum broth, minute smooth colonies developed as described above, in 24 hours, only just visible to the naked eye. The colonies showed a faint but well-defined zone of beta-haemolysis and were composed of very small, slender, straight, Gram-positive rods. Rough colonies developed later and were composed of long, thread-like filaments. A slight increase in size took place after

further incubation and beta-haemolysis became more intense. After 14 days' incubation all colonies became rough. On a few occasions the organism failed to grow on blood agar plates.

Serum Agar Plate.—As described for blood agar plate.

Agar Slope.—Growth with any kind of inoculum was feeble and confined to the bottom of the slope. The colonies were composed of a mixture of short and filamentous forms.

Blood Agar Slope.—After 24 hours' incubation at 37° C. a good growth occurred of raised, colourless, transparent, imperfectly confluent colonies. The edges of the growth were crenated and there was a slight viscosity at the bottom of the slope. No change took place after further incubation. The growth was composed of a mixture of short and long forms.

Broth.—Feeble growth only, of a finely granular character and composed mainly of long, filamentous forms.

Serum Broth.—After 24 hours' incubation at 37° C. a very slight cloudiness developed with a considerable, almost floccular sediment at the bottom of the tube which broke up into granules when agitated. This growth occurred regularly whatever the inoculum. Smears showed small, straight rods, often in packets. A few longer, more thread-like forms were also seen, having a beaded effect, rather similar to the appearance of the tuberculosis organism when stained by Ziehl-Neelsen's method. No increase in growth occurred after further incubation but the cloudiness disappeared.

Martin's Broth.—As described for serum broth.

Martin's Broth with 5 per cent. Glycerine.—As described for serum broth.

MacConkey's Agar.—No growth.

Liver Agar.—No growth.

Gelatin Stab.—After four days at room temperature a typical test-tube brush growth developed.

Biochemical Reactions.—No acid or gas were formed in dextrose, lactose, saccharose, maltose, dulcite, mannite, arabinose, dextrine, raffinose, rhamnose, salicin, sorbite, xylose or inosite. Negative methyl red, Voges-Proskauer and indole tests. No reduction of methylene blue or nitrates. Hydrogen sulphide produced. Catalase positive.

Smooth-Rough Variation.—Both smooth and rough forms were found in the original valve lesions. On all media smooth forms tended to become rough after two days. Rough colonies were characterized by irregular edges from which fine, granular outgrowths or pseudopodia projected. Slides taken daily from colonies becoming rough showed that the organisms changed from the small, straight, frankly Gram-positive rods typical of smooth colonies, to long, filamentous, thread-like forms tending to become Gram-negative. The larger and older, rough colonies were composed of mycelia of long, interlaced, Gram-positive filaments, and single rods which were frankly Gram-negative. After eight days' incubation many colonies still remained smooth and were composed of short rods which, however, had largely lost their Gram-positive character. After 14 days' growth on blood agar plates all colonies became rough with raised, greyish-white centres, and various pseudopodia-like processes growing outwards. The edges of these colonies frequently resemble anthrax colonies.

Smoothness was maintained when subcultures were frequently made. In serum broth, the morphology of organisms remained unchanged, but after long periods they became less frankly Gram-positive.

When broth and serum broth tubes were inoculated with pigeon blood containing smooth forms only, and incubated for 24 hours at 37° C., the serum broth grew organisms identical with the parent culture, whereas the broth tube was found to contain only rough forms. This observation was confirmed on several occasions.

Pathogenicity

Pigeons.—Two pigeons were inoculated intramuscularly with 0·1 c.c. of a 24 hours serum broth, pure culture, obtained by direct inoculation from the valvular lesions. One pigeon died in less than 48 hours, the other in three days. The most striking *post-mortem* lesions were the distension of the heart-sac by about 2 c.c of lemon-yellow, clear fluid, and an enlarged liver having a dark, reddish-purple mottled colour. The spleen also was enlarged. Slides from the heart, liver and spleen revealed the presence of the organism in large numbers, easily recoverable in pure culture.

Two pigeons were inoculated intramuscularly with 0·5 c.c. and 0·25 c.c. respectively, of a 24 hours serum broth, pure culture, obtained from a single, smooth colony on a blood agar plate which had been incubated for 48 hours at 37° C. Both pigeons remained healthy. A third bird was inoculated similarly with 3·5 c.c. of the same culture. It died in 48 hours. An emulsion of its heart, liver and spleen was made and 0·5 c.c. of this given to a fourth pigeon which died in three days.

Mice.—Mice inoculated subcutaneously and intraperitoneally with 0·1 c.c. of a 24 hours serum broth, pure culture, died regularly in about three days, after showing general signs of sickness accompanied by a purulent conjunctivitis. *Post-mortem* examinations showed a black-coloured spleen, an enlarged, dark, mottled liver and a congested heart. The organism was recovered without difficulty in pure culture from these organs.

Rabbits.—Two rabbits received 1·0 c.c. subcutaneously and 0·5 c.c. intravenously, respectively, of a 24 hours serum broth, pure culture. Both survived. A third rabbit was given an intravenous injection of 0·5 c.c. of an emulsion of heart, liver and kidneys from a pigeon which had died from erysipelas artificially induced. It died in three days. The *post-mortem* examination showed no lesions of special significance but the organism was recovered in pure culture from the liver.

Guinea-pigs.—All attempts to infect guinea-pigs failed.

Swine.—Several attempts were made to infect pigs by subcutaneous inoculations using (*a*) 10 c.c. serum broth, pure culture (smooth form), (*b*) 10 c.c. emulsion of pigeon heart, liver and kidneys abounding in smooth organisms and (*c*) 10 c.c. serum broth, pure culture, repeated eight times at two to three day intervals. On all occasions the pigs remained in perfect health and showed no clinical symptoms whatever.

Discussion

When the cases of swine erysipelas reported in this paper were confirmed, it was feared that they might prove to be the precursors of a large-scale outbreak. Happily, however, only one further case has been confirmed since that date (Fitzpatrick, 1946), which leads one to ponder on the nature of the organism as it occurs in Kenya, and to conjecture to what extent the disease may have been present for some years in an unrecognized form. Veterinary officers in the field are familiar with various pig ailments characterized by affections of the joints of a rheumatoid nature. In 1940 a report was received from a bacon factory (Purchase, 1947) of a death in a young pig bearing the classical diamond skin lesions of swine erysipelas. In 1943, two workers at this laboratory (Barnett, 1947), after investigating an outbreak of disease amongst pigeons, became infected with a skin disease which bore every resemblance to human erysipeloid. It seems not unreasonable to suppose that the disease in Kenya has, in fact, existed for some time but that it is very mild in character and in consequence not usually correctly diagnosed. Efforts were made to trace the origin of the three known cases without success, and no opinion can be advanced as to how the disease first gained access to the colony beyond stating that a number of young boars and gilts have been imported from the United Kingdom during the past ten years.

The organism's morphology, staining reactions, growth on laboratory media, biochemical reactions and pathogenicity are largely in accordance with the descriptions to be found in standard works [Edwards (1931), Bergey (1939), Merchant (1942), Topley & Wilson (1943), Kelser & Schoening (1943), Gaiger & Davies (1946) and others] although agreement is not always evident between authors on minor points, such as biochemical reactions. Watts (1940), for instance, in a study of 43 strains, found that all of them produced acid in glucose, maltose, lactose, laevulose, starch and dextrine. The most suitable media for routine work and for maintenance were undoubtedly serum broth or Martin's broth. Growth on less suitable media was characterized by a rapid conversion from the smooth to the rough state, accompanied by a distinct trend towards a Gram-negative reaction. On some media, broth and agar, for example, growth only occurred when inoculated from animal tissues. The most suitable solid medium was the blood agar plate.

Pathogenicity tests revealed that, with the exception of mice, the virulence of the organism for laboratory animals and pigeons rapidly decreased after maintenance in laboratory media or after a few subcultures. Loss of virulence, however, could be counteracted by passage through pigeons, a large dose (3½ c.c. intramuscularly) of pure culture being necessary in the first instance, and rough organisms became smooth with similar treatment. The failure to infect pigs was not unexpected in view of similar failures by other workers. Topley & Wilson (1943) state that Schutz successfully infected pigs by subcutaneous inoculations of pure cultures, but more recent work by Mulder (1940), Schoening, Peterman & Grey (1940) and Hegyeli (1943) suggests that greater success is likely to be had by intravenous or intranasal inoculations, or by ingestion.

Summary

1. Swine erysipelas is reported for the first time in Kenya.

2. The disease appears to be very mild in character and shows no signs of assuming epidemic form. Three cases have been confirmed, all from different parts of the colony.

3. The bacteriological, biochemical and pathogenical characteristics of the organism are reported and discussed.

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Porcine Trypanosomiasis

By

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In the literature on trypanosomiasis, there is remarkably little information of specific value about the disease in pigs save for descriptions of the pathogenesis of *T. simiae* which is undoubtedly very lethal to the pig but at the same time relatively uncommon. Stewart (1936) in his paper "Porcine Trypanosomiasis in the Gold Coast" (*Trans. roy. Soc. Trop. Med. & Hyg.* **30**. 313) gave a description of its form in the Gold Coast which is similar to that described by observers elsewhere. But information about trypanosomiasis caused by other parasites is vague. In 1946, while experimenting with phenanthridinium, pigs were infected with *T. vivax*, *T. congolense* and *T. brucei* and it was found that while these parasites could with ease be introduced and appear in the blood stream of the pig, they caused no visible symptoms although the pigs used were pure-bred pedigree Large White and Large Black swine. Five pure-bred pigs were infected with *T. vivax* and five with *T. congolense* in February, 1946, and five months later parasites were still present in blood films though very scanty; no clinical symptoms had appeared and the pigs which were weaners at the time of infection showed normal weight gains and had normal blood counts throughout the period. Six half bred Large Black native pigs with a mixed infection of *T. vivax* and *T. congolense* showed the same reactions. Thirty pigs were infected with *T. brucei* and showed the same results. These pigs were either controls or were used in connection with phenanthridinium experiments so that it was decided to inoculate other pigs and try a straight experiment in order to see if it bore out the observations just noted.

In the second experiments 21 pigs were inoculated with *T. vivax* and showed evidence of infection for two to five months; 16 were similarly infected with *T. congolense* and 51 with *T. brucei*. Controls were selected from the same litters as the infected pigs and weight gains were similar for infected pigs and controls. Parasites were numerous in the blood on first appearance and gradually diminished in numbers, but in no infected pig was there ever absence of parasites in blood slides or marked difficulty in finding the trypanosomes. Blood counts were normal and there was no appearance of morbid processes of any kind. Half of the pigs were slaughtered locally for food and on *post-mortem* examination no lesions were found which could be attributed to trypanosome infection.

In the first experiments all pigs were infected by direct transmission by hypodermic needle, but in the second, tsetse fly infection by *T. brucei* was tried on eight pigs, three of which became infected. It was difficult to get the flies to feed when they were placed against the pigs' skin in a gauze box. Infection was more scanty in each case than in those infected by the needle. No symptoms nor abnormality of any kind supervened.

INCUBATION PERIODS.—With *T. vivax* pigs became infected four to 15 days after inoculation, usually within seven days. With *T. congolense* the incubation period varied from seven to 56 days, usually about three weeks. One lot of six half bred Large Black × native pigs were given a mixed infection of *T. vivax* and *T. congolense*. All became infected by *T. vivax* in from five to seven days, while *T. congolense* did not appear until from the twenty-first to the thirtieth day. This mixed infection did not cause illness and persisted for three months until the pigs were treated and sterilized by phenanthridinium.

With *T. brucei* the incubation period varied from seven to 32 days, averaging 15 days. Three tsetse allowed to feed on infected pigs showed parasites on the ninth, twenty-fourth and fifty-seventh days respectively.

The writer described an outbreak of *T. brucei* infection in the article referred to above, but the condition was complicated by *Metastrongylus apri* infection and further observations on the latter infection have produced the symptoms described in that article. Many blood slides from sick pigs in the forest areas have been sent to the Pong-Tamale laboratory and trypanosomes have been demonstrated in the blood, but the writer had the privilege, thanks to the courtesy of the Director of Agriculture, of having the details of several presumed outbreaks of trypanosomiasis in pigs at their forest farms when parasites had been seen in the blood; it was evident that except in cases of *T. simiae* infection, which had been seen by the Veterinary Officer, there had been other complications in all outbreaks. The evidence in this article is far from conclusive and the observations are not as thorough as the writer would have wished because of acute staff shortage, but they give grounds for further investigations into porcine trypanosomiasis. The experiments show that the pig is easily infected with the three common trypanosomes, but that they seem to have no pathogenic influence under normal conditions. Five pigs each infected by *T. vivax* and *T. congolense* and six infected with *T. brucei* were exposed to grave under-feeding with their controls to the degree that they failed to put on weight and some lost weight; all lost condition. At the end of a month when put back to full rations, all pigs went ahead equally. No particular symptoms attributable to trypanosome infection were seen in the experimental pigs and the control animals gave precisely similar reactions to this under-feeding.

The pigs used in these experiments were all weaners when infected and with the exception of the pigs described which received the mixed *T. vivax-T. congolense* infection, were either pure-bred Large White Yorkshires or Large Blacks. The experiments were carried out on the farms attached to the Pong-Tamale laboratory. A vital point is that the pigs concerned were healthy animals without any of the complications of chronic helminth or other infection and that the pigs exposed to adverse feeding were otherwise healthy.

The *T. vivax* infections were from one original bovine strain, the *T. congolense* from two bovine strains and the *T. brucei* from two strains, one equine and one canine. Some pigs were infected with blood drawn from the host animal, citrated and used some time later and others were inoculated on the spot straight from the infected animal.

Blood examination was daily and by wet film with stained preparations for special examination when required. The pigs could not be maintained indefinitely owing to lack of room, but in no case were they disposed of until it was reasonably certain that no pathogenic manifestation was going to occur. Treatment was by phenanthridinium which was uniformly successful, but in a number of cases hogs were slaughtered for local consumption untreated.

Since 1931, when the Pong-Tamale laboratory opened, many slides have shown *T. brucei* in the blood of pigs, *T. congolense* has been seen once, while *T. vivax* has not been seen. The histories of the outbreaks which have not been seen, particularly in the forest areas, have invariably suggested that other causes were primary and have varied considerably, while in no case where it has been possible to make an investigation has it been found that trypanosomiasis was the clinical trouble save when *T. simiae* was the causative organism. Hence available information shows that natural outbreaks are at least rare and these experiments suggest that the presence of trypanosomes in the blood means little and that such are rarely pathogenic.

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In a recent issue of the *Farmer and Stock-Breeder*, "Blythe" draws attention to the danger inherent in the prevalent practice of sending young draught horses for slaughter, adding that it is not too late for the heavy horse societies to start a general publicity campaign.

CLINICAL COMMUNICATIONS

A Case of Cranial Nerve Tumour with Acquired Hydrocephalus in the Dog

JOAN O. JOSHUA
Finchley
and
C. W. OTTAWAY*
Zoological Department, University of Cambridge

Subject.—9½-year-old mongrel, female.

Clinical Record.—The first symptoms observed were an inability to open the left eye, accompanied by photophobia and conjunctivitis. In the course of a month no improvement was noticed by the owner and examination at this time revealed complete paralysis of the upper and partial paralysis of the lower eyelid. The pupil was widely dilated and did not respond to light. The left ear was drooping sideways and could not be held erect in response to sound. Atrophy of the left temporal muscle and slight paralysis of the left commissure of the lips was observed, and although the animal could eat fairly well it always appeared to chew on the right side.

A diagnosis of brain tumour was made. Since the symptoms appeared to cause little inconvenience the advice given was to keep the dog until it was no longer able to lead a reasonably normal life. A request to destroy the animal was received three weeks later. By this time marked mental changes had supervened; the dog was dull and lethargic and groaned and snored while asleep. There appeared to be pain in the head and rubbing of the affected side was appreciated. The left masseter muscle now also showed signs of atrophy.

Post-mortem Findings.—The head presented marked atrophy of the left temporal and masseter muscles and, to a lesser degree, of the left pterygoid muscle. Ascertainment of total weight measurements for comparison with contralateral muscles was not attempted, but the estimated weight difference between right and left was of the order of 4:1, while over the parietal bones the right temporal was six times the thickness of the left. The affected muscles were extremely difficult to cut and changes seemed confined to the muscle fibres as the muscle sheaths and tendinous intersections, which are very numerous in these muscles, appeared normal. Histological evidence revealed a clear intra-muscular connective tissue framework with poorly developed muscle columns within, situated away from the endomysium.

The brain was removed with some difficulty owing to the fibrous nature of the meninges. The dura mater was firmly adherent to the cranial bones and showed areas of calcification, particularly in its main reflections—the falx cerebri and tentorium cerebelli. In fact the free edge of the tentorium was adherent to the anterior medullary velum, the fold of white substance backed by pia mater passing from cerebellum to the posterior corpora quadrigemina, and the enlargement of these membranes had caused pressure on the roof of the fourth ventricle and the caudal part of the aqueduct of sylvius, which connects fourth and third ventricles, resulting in partial occlusion of the lumen of these cavities. Furthermore, the lateral and third ventricles were distended with an excess of cerebro-spinal fluid (acquired hydrocephalus), and it is suggested that this was associated with the partial occlusion of the fourth ventricle and the aqueduct, as the flow of cerebro-spinal fluid which normally passes through these channels would have been impeded. This interference with the course of the cerebro-spinal fluid and the subsequent rise in intra-cranial pressure was possibly responsible for the symptoms of pain in the head. Inflammatory changes with deposition of minute calcareous granules were also observed in the choroid plexus of the fourth ventricle.

The left oculomotor (third cranial) nerve showed an ovoid swelling 3 × 2 mm. in size situated immediately anterior to its origin from the brain. The left trigeminal (fifth cranial) nerve showed a larger swelling 7 × 5 mm. in size involving the semilunar ganglion. Histological examination of these neoplastic lesions demonstrated an increase of fibrous tissue and disorganized growth of nerve fibres. In the semilunar ganglion, degenrative changes in the nerve cells with loss of processes were observed.

The involvement of these nerves is in keeping with the clinical and other *post-mortem* findings, as the third nerve is concerned with innervation of the muscle of the upper eyelid and the sphincter muscles of the iris, while the fifth nerve supplies the muscles of mastication. The drooping of the left ear and paralysis of the left commissure of the lips suggests a lesion of the seventh cranial nerve. No lesion, however, was found associated with this nerve, although the growth on the root of the fifth nerve was sufficiently proximate to suggest a pressure paralysis. Alternatively, interference with the normal activity of the left ear and lip muscles might have been associated with atrophy of the neighbouring masticatory muscles.

Remarks.—This case is presented as an instance of clinical findings confirming accepted functional activity, as an example of the possible symptoms in acquired hydrocephalus, and on account of the relative scarcity of records of intra-cranial nerve lesions in veterinary literature.

* Senior Wellcome Fellow of the Veterinary Educational Trust.

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A Case of Light Sensitization in a Heifer

JOHN F. BRADLEY, M.R.C.V.S.
Fishguard

Subject.—A two-year-old Friesian heifer.

History.—About a fortnight previously, the owner had noticed the animal a little dull and off her appetite, but had no subsequent occasion to remark upon her. Early upon the morning upon which I was summoned the animal was discovered beside a hedge in obvious distress. She was, with some difficulty, brought into a shed.

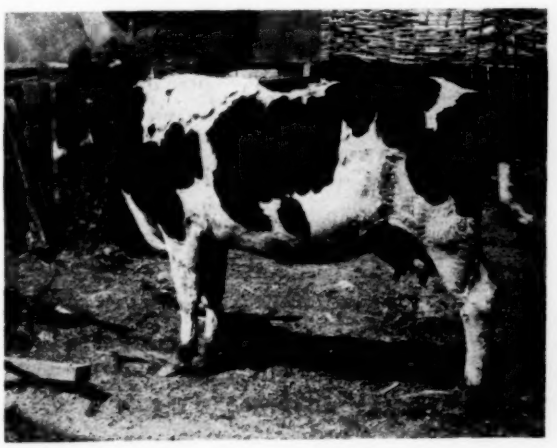
Symptoms.—The symptoms of immediate interest were the skin lesions. It was found that in areas corresponding to almost all the white parts of the coat, the hide was necrosed and partially sloughed. The surfaces of skin revealed by these sloughs were not inflamed, presenting in most cases the evident development of new epithelium and advanced healing.

The pulse was feeble, breathing accelerated, and temperature a little below normal. There was slight salivation and restlessness was marked.

Treatment.—The condition was deduced to be an anaphylaxis. No adrenalin was at hand but instead a heart tonic injection (digitalin 1/10 gr., spartein sulph. 1/5 gr., strychnin. sulph. ¼ gr.) was given. All light was excluded from the shed and the heifer was left without food and in complete darkness.

Upon revisit, six hours later, the animal was on its feet and apparently normal. It was maintained in partial darkness and on dry food for a few days, then gradually turned out to pasture by progressively longer stages. No recurrence has been reported.

Discussion.—It is known that certain pigments in the blood, especially haematoporphyrin, sensitize living cells to light. Most cases reported abroad have been associated with the consumption of buckwheat or clover. Toxic effects have been produced in experimental animals by chlorophyll. In the present case, the subject in company with a number of similar heifers had been grazing for about a month previous on a rather bare permanent pasture upon which the only conspicuous vegetation was thistles. The weather for about a week previous was dull with slight showers, but had been preceded by a protracted spell of very bright, sunny weather.



The writer is indebted to Dr. N. S. Barron for furnishing the accompanying photograph of lesions in a case of light sensitization in a Friesian heifer.

(*For references see foot of next col.*)

Questions and Answers

The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Pregnancy Diagnosis in the Cow and Mare

Q. CCXXIV.—*What is the best method of pregnancy diagnosis in* (a) *the mare and* (b) *the cow, and at what stage of pregnancy should one be able to give a reasonably positive opinion?*

A.—Clinical evidence of pregnancy in the mare and cow may be obtained at a relatively early stage by rectal palpation of the genitalia but anatomical differences in the genital tracts of the two species demand recognition in an approach to the problem.

The most outstanding differences from the clinical aspect are related to the prominence of the cervix, the degree of divergence of the uterine horns and their subsequent course, the location of the ovaries and, in addition, to variations in ovarian activity between the two species. Thus, in the mare, the contours of the cervix are indistinct, the uterine horns are straight, widely divergent and course forward and outward to terminate very abruptly behind the ovaries which are located in the sublumbar region. The corpus luteum of the mare is not identifiable per rectum when older than about 48 hours and the primary corpus luteum of pregnancy apparently regresses within the first three weeks of gestation. Ovarian activity continues to be very marked for the first 70 days of pregnancy, so that the recognition of apparently mature follicles in the ovary must not be interpreted as indicating the absence of pregnancy. In contrast, the cervix of the cow is prominent and readily identified, the uterine horns lie close together, being united by an intercornuate ligament, and they are reflected downwards and backwards towards the ovaries which lie close to the pelvic brim. The corpus luteum is readily palpable and often comprises almost the whole of the parent ovary and follicular development is in abeyance.

In the mare pregnancy may be established at four to five weeks by identification of a firm, tense, fluid, circumscribed enlargement of one uterine horn about the size of a hen's egg, usually situated in the lower or mesial half of the pregnant horn, frequently at the junction of uterine body and horn. Location of the uterine horns may be facilitated by tracing the organ downwards from the ovary. It is emphasized that competence in the diagnosis of pregnancy in the mare demands the ability to engage the circumference of the uterine horn with the hand so that each horn may be traced along its course and changes in diameter and consistency recognized. In about 2 per cent. of pregnant mares implantation is said to take place in the body of the uterus and such pregnancies are not detectable clinically before the sixtieth day.

Careful palpation of the whole length of the uterine horns of the cow and heifer will enable the clinician to make a positive diagnosis of an existing pregnancy at five to six weeks. The enlargement of the pregnant horn possesses rather different characteristics from those cited for the mare. The enlargement is less circumscribed, less tense and fluctuation is pronounced. In addition the foetal membranes are readily palpable by gradually releasing a fold of the uterine wall from between the middle finger and thumb, when the abrupt escape of the foetal membranes gives unmistakable evidence of pregnancy. As in the mare, successful early diagnosis demands the ability to palpate the whole length of the uterine cornua. The fluctuating swelling which is the only reliable evidence of early pregnancy is not recognizable if palpation is restricted to the posterior portion of the uterine horns.

It must be admitted that the strong uterine contractions which are frequently induced by manipulation occasionally render complete examination extremely difficult and sometimes impossible. At seven to eight weeks the enlargement of the pregnant horn has extended to the non-gravid horn and at nine weeks pregnancy may be established by even superficial palpation. Finally it may be stated that pregnancy in the bovine is always associated with the presence of a clinically recognizable corpus luteum which, almost invariably, is situated in the ovary which corresponds to the pregnant horn. The corpus luteum of pregnancy, however, is indistinguishable from the dioestrous corpus luteum and is not in itself evidence of pregnancy.

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Anasarcous Bull Calves

Q. CCXXV.—*It was noted that in a certain batch of heifers every bull calf was anasarcous whereas heifer calves were normal. These heifers were all the progeny of a bull which was sold because of unthriftiness. The owner's present bull has been successfully used on other cows producing normal calves. Would it be wise to retain these heifers and their progeny for breeding purposes in view of possible recurrence?*

A.—The question asked implies the possibility of the abnormality in the bull calves being hereditary, and this may quite well be the case, as several types of lethal dropsy in calves are recorded in genetical literature. In the absence of any statement by the questioner of the number of animals involved, it is not possible to determine the probable mode of inheritance of the abnormal character with any certainty, although there is an indication that it may be transmitted as a sex-linked recessive. Assuming this to be a correct interpretation, then there is little likelihood of the heifers, which were sired by the same bull as the abnormal male calves, producing abnormal male calves in their turn *provided* they are mated to an unrelated bull, *i.e.*, one with no common ancestor or ancestors in its pedigree for several generations back. If this breeding policy is adhered to for the heifers and also their progeny, they could be retained for herd replacement with little possibility of the abnormality in question ever recurring. It might also be a wise precaution to impress on the owner of the herd in question that he should never retain any bull calf from the dams of the heifers under consideration, from the heifers themselves or from their female progeny for use in his own herd, otherwise a degree of inbreeding would be established which would certainly favour the abnormality cropping up again at some future date.

REVIEW

["**The Veteran**" (Journal of the Glasgow Veterinary Branch of the British Legion and of the Students' Representative Council, The Glasgow Veterinary College, 83, Buccleuch Street, Glasgow).]

Originally designed, as is suggested by its title, as the organ of the internal branch of the British Legion which stands to the credit of the Glasgow Veterinary College, it is indicated in this inaugural issue that the next will be produced by the Students' Representative Council and the G.V.B. of the Legion as the official magazine of the Glasgow College.

We welcome this new production, which brings to completion the list of our college magazines. It needs but to maintain the standard of the maiden number to ensure the success wished upon it in published messages from the President of the Royal College, the Principal (in a Foreword) and the Hon. President of the local Legion. Well printed on good paper, the admirably arranged material adds to its record of College and Legion activities numerous features of veterinary interest "of equal reading value to an outsider as to the students of the College"—to quote an aim indicated in the editorial. For instance, Capt. D. Danby, M.R.C.V.S., exemplifying the value of team work, writes most interestingly of his experience while responsible for the veterinary side of the War Dogs' Training School, while the impressions given by Col. J. Judge of the activities of the veterinary officer in the Middle East constitute a vivid record of historical value. Mr. A. H. Robb contributes effectively in his capacity as Veterinary Surgeon to the Glasgow Mounted Police, and "P.G." is well worth reading on the stubbornly interesting subject of mules, while Capt. Watts' vivacious study of the College in 1910 and Mr. Lauder's "Day at the Animal Clinic" are pen pictures of merit.

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A copy of the following book has been received: "Tuberkulöse Reinfektion beim Rinde und ihr Einflufz auf die Resistenz," by Dr. E. Gräub. Published by S. Karger, Ltd., Holbeinstrasse 22, Basle, Switzerland. Price Swiss francs 12.

Weekly Wisdom

The British have never been regarded by themselves, or even by other people, as a ruthless lot.—"The Times."

ABSTRACTS

[**An Improved Chemical Dehorning Agent for Young Calves.** Guthrie, J. E. (1947.) *Vet. med.* **42**. 284-288.]

The advantages of de-horning young stock and a review of the current methods of accomplishing this are enumerated in a well-illustrated article abundantly supplied with data.

Guthrie chemically dehorned 47 young calves whose ages ranged from five to 14 days, employing six escharotic formulae, of which the most effective was 28 per cent. antimony tri-chloride, 7 per cent. salicylic acid, and 65 per cent. flexile collodion (U.S. Pharmacopoea).

After preliminary clipping and cleansing of the area around the horn-bud the solution was applied on a brush. The method proved greatly superior to those in general use in that it produced within ten minutes a water-resistant flexible film which destroyed the underlying tissue with very little pain. The solution was not transferred by the suckling calves to the flanks or udders of their dams.

J. P.

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[**"A Progress Report on the Investigations into the Aetiology and Control of Enzootic (Toxaemic) Jaundice of Sheep." Investigation Committee Report (1947).** *Aust. vet. J.* **23**. 38-50. (2 refs.).]

Experiments were undertaken with flocks maintained at a field station where the disease occurs and with sheep kept at the laboratory. Natural outbreaks were also studied. The result of such observations indicated that enzootic jaundice is correlated to a rise of liver copper, the jaundice sometimes being of haematogenous origin, more often hepatogenous. The disease is enzootic although sporadic outbreaks may occur as a result of accidental exposure to copper contaminated material. The enzootic disease is commoner in older ewes corresponding with the slow build up of copper in the liver. It is also commoner in British breeds of sheep. In some districts in which the disease is enzootic the soil contains an unusually high proportion of copper but in other enzootic districts, this is not the case. The species of flora eaten appear to influence absorption of copper and prevalence of the disease. *Heliotropium europocum* is noteworthy in this respect. Furthermore, the onset of the disease in sheep possessing high liver-copper values is often brought about by nutritional and other stresses. Nevertheless, such sheep maintained at a high plane of nutrition do eventually succumb to the disease.

A. W. G.

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[**The Relationship between the Virus of Contagious Pustular Dermatitis and a Virus from Sheep Papillomatosis isolated by Selbie.** Horgan, S. E., & Haseeb, M. A. (1947.) *J. comp. Path.* **57**. 8-12.]

A comparative study was made of a virus isolated by Selbie from papillomatosis lesions on the lips of a lamb, which resembled contagious pustular dermatitis. Selbie found that the virus was transmissible to rabbits, but that the rabbit adapted virus would not infect sheep. In the experiments described, whereas rabbits inoculated with Selbie's virus showed a reaction with an almost constant incubation period of 29 to 30 days, English and a freshly isolated Cyprus Strain of C.P.D. virus produced lesions in three to four days. Cross immunity tests in rabbits with Selbie's and C.P.D. viruses showed no evidence of any immunological relationship between them. Furthermore, Selbie's virus was not transmissible to sheep. The authors stress the fundamental importance of using genetically "pure" rabbits in experimental infection with animal pox viruses.

S. J.

A correspondent writes: "During a recent conversation with an official of the Forestry Commission, who conduct large-scale operations in this area, the subject of soil analysis and chemical fertilizers was mentioned.

"I was informed that every year a sample of the soil from a local nursery was forwarded for analysis and a report was received indicating what chemical fertilizers were to be used. The official stated that the soil is gradually losing its fertility and that if some green crops are not ploughed in every year he considers the owner soon will not be able to grow anything; in his opinion the soil requires natural manure."

REPORT

Annual Administration of the Army Veterinary Service in India for 1945-46

The great task of the Army Veterinary Service in India during 1945-46 is not fully revealed by the cyclostyled report under review. Doubtless printing and clerical difficulties account for its limitations.

The report shows that the Service was responsible for the health of some 10,000 horses, 26,000 mules, 5,500 donkeys, 4,000 camels and 7,000 bullocks. To these must be added the cattle of the Military Farms Dept., averaging about 8,000 cows and 57,000 buffaloes, as well as 20,000 pigs, 150,000 poultry and 11,000 rabbits in various centres throughout India. In October, 1945, meat inspection was placed under veterinary control and by the end of the year nearly 30,000 carcases had been examined.

The work involved demanded a great increase in personnel which, about the middle of 1945, totalled 7,142, including 272 officers and 351 veterinary assistants, some of whom had received emergency commissions. The list of units includes 72 hospitals in forward and rear areas and recent innovations such as Veterinary Conducting Sections, Brigade Veterinary Sections, Anti-Surra units and Clipping Teams. Brief statistics are given of the number of personnel trained at the Army Veterinary School: 20 Officers, 57 V.C.O.s, and 142 Other Ranks in First Aid and Animal Hygiene, and 246 Other Ranks (British and Indian) as farriers.

The control of contagious disease was obviously a problem of first importance. Over 1,800 sheep and goats died from anthrax: experiments with spore vaccines were inconclusive. Contagious pleuropneumonia proved fatal to nearly 22,000 sheep and goats, mortality being 78 per cent. of admissions. Epizootic lymphangitis was prevalent among animals returned from S.E.A.C., 39 cases occurring during the worst month—September, 1945. The value of Cryptococcin as a diagnostic agent is discussed and it seems that the necessity for the dispersal of animals at the end of the war made accurate assessment of its merits difficult. The mortality from strangles was only 1 per cent. as compared with 60 per cent. during the previous year and it is suggested that sulphanilamide treatment may have been responsible for the improvement. Routine testing for equine surra imposed a severe strain on personnel, but it was responsible for the efficient control of a great menace. There were 49 cases of which eleven died.

The work of the Veterinary Laboratory in Lahore is described in some detail. Over 5,000 specimens were dealt with and research work was undertaken in connection with abortion, scours, ulcerative necrosis, anthrax, pleuropneumonia in goats, rinderpest and joint-ill.

Part VI of the report deals with cattle of the Military Farms Dept., among which there were nearly 60,000 admissions during the year, 13 per cent. of which died or were destroyed.

There were some 8,000 cases of foot-and-mouth disease, with 108 deaths.

Rinderpest was controlled by systematic inoculation with goat virus. Mastitis affected nearly 3,000 animals which were usually treated by sulphanilamide *per os* and intramammary injections of acriflavine. Epidural anaesthesia was found very useful in replacement of everted uteri.

Some 80,000 rectal examinations were carried out in connection with pregnancy diagnosis.

The report ends with an acknowledgment of assistance rendered by Dr. F. C. Minett, C.I.E., M.B.E., D.SC., and his staff at the I.V.R.I., Mukteswar.

G. B.

CENTENARY OF CHLOROFORM ANAESTHESIA

The discovery of the use of chloroform as an anaesthetic, made by Sir James Young Simpson in Edinburgh in 1847, was marked by a graduation ceremony at the University at which the honorary degree of LL.D. was conferred on Dr. H. W. Featherstone, founder-president of the Association of Anaesthetists of Great Britain and Mr. T. B. Simpson, a grand-nephew of Simpson. A meeting to discuss the present-day use of chloroform was also held, at which Professor R. R. Macintosh (Oxford) and Drs. D. S. Middleton and John Gilles (Edinburgh) read papers. Dr. Douglas Guthrie, lecturer on the history of medicine in the University of Edinburgh, gave an address at a reception in the Upper Library, where an exhibition of Simpson relics had been arranged. Dr. Guthrie said that the discovery of chloroform anaesthesia was one of the most dramatic episodes in the history of medicine, and with antiseptics had revolutionized surgery; it was remarkable that it had been delayed until the middle of last century.

QUESTIONS IN PARLIAMENT

Petrol Allowances

Mr. Challen asked the Minister of Fuel and Power whether he will now issue instructions under which medical and veterinary men will be allowed to use their cars without restriction for all purposes, having regard to their long hours of work and their need for occasional relaxation, provided always they can be quickly recalled in the event of any emergency.

Mr. Gaitskell: No, but I fully appreciate the special difficulties which members of these professions may experience and I am in touch with the British Medical Association and the National Veterinary Medical Association on the matter.

[We hope to be in a position to publish a statement on this matter by the Association in our next issue.—*Editor.*]

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Veterinary Education

Mr. Janner asked the Minister of Agriculture, in view of the new programme for increasing the livestock population of the country, what steps he proposes to take to ensure a more rapid development of veterinary education in this country; and whether, in this connection, he can give an assurance that legislation will shortly be introduced to deal with the activities of unqualified veterinary practitioners and other related matters.

Mr. T. Williams: I am sending my hon. Friend a copy of a statement I made on April 1st, 1946, from which he will see that the Government recognize the need for improved facilities for veterinary education, and for dealing with veterinary practice by unregistered persons. I am, however, unable to say at present when it will be possible to introduce legislation.

Mr. Parkin: Will my right hon. Friend consult with the Minister of Labour to see whether unlicensed veterinary practitioners could not be directed to the engineering industry, to produce the machinery in order to import maize, which is waiting in Yugoslavia?

Mr. Williams: That is an entirely different question.

. . . . .

Foot-and-Mouth Disease (Immunization)

Mr. Percy Wells asked the Minister of Agriculture whether he is satisfied that his Department is fully informed on the experiments in the immunization of cattle against foot-and-mouth disease, carried out in the Argentine; and whether he is prepared to give immediate consideration to the immunization of British stock generally.

Mr. T. Williams: My Department is fully aware of the nature of the immunization experiments against foot-and-mouth disease that have been carried out in the Argentine. There are, however, essential differences between conditions in Argentina and here, and I am not prepared to give my support to a practice which, I am advised, could not give complete protection but might tend to mask the disease, and thus to render the eradication policy less effective.

Mr. Turton: Is the Minister aware that the Argentine Rosenbusch vaccine gives only partial protection, but the Waldmann vaccine provides complete immunity?

Mr. Williams: My veterinary advisers inform me to the contrary. In any case, two of my veterinary surgeons are in the Argentine now.

Mr. Turton: Will they go on to Chile, where they have got a good deal further than the Argentine?

. . . . .

Fowl Pest

Mr. Snadden asked the Minister of Food in view of the discovery that evisceration is no adequate protection against the dissemination of the germs of the disease known as fowl pest, what consultations he had with the Secretary of State for Scotland before permitting the landing and distribution in Scotland of turkeys from Europe, and whether consultation with the poultry-farming industry in Scotland took place before the decision to permit such landing and distribution was made.

Dr. Summerskill: I would refer the hon. Member to the reply given to my hon. Friend the Member for South Ayrshire (Mr. Emrys Hughes) by my right hon. Friend the Secretary of State for Scotland on November 18th. As no European turkeys have been landed or distributed in Scotland, the questions asked by the hon. Member do not arise.

NOTES AND NEWS

Diary of Events

Dec. 9th.—R.C.V.S. Membership Examinations commence.

Dec. 10th.—R.S.I. "Benjamin Ward Richardson" Lecture, at the Institute, Buckingham Palace Road, S.W.1: "The Transport, Handling and Lairage of Animals intended for Slaughter," by C. G. Allen, M.R.C.V.S., D.V.S.M., Chief Veterinary Officer, Birmingham. Professor Geo. H. Wooldridge, F.R.C.V.S., M.R.I.A., in the chair; 2.30 p.m.

Dec. 10th.—Meeting of the South-Eastern Division, N.V.M.A., at Beckenham (Wellcome Physiological Research Station, Langley Court), 2.30 p.m.

Dec. 10th.—Meeting of the Lancashire Division, N.V.M.A., at Liverpool (Geology Lecture Theatre, Brownlow Street), 2.30 p.m.

Dec. 10th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, 1, Wimpole Street, W.1, 5 p.m.

Dec. 13th.—Meeting of the Biochemical Society, London School of Hygiene, Keppel Street, W.C.1, 11 a.m.

Dec. 19th.—Meeting of the Association of Veterinary Teachers and Research Workers (Northern Region) at the University of Liverpool Veterinary Field Station, Leahurst, Neston, Wirral, 11 a.m.

Dec. 31st.—Latest date for changes of address to be notified to the Registrar, R.C.V.S., for inclusion in the 1948 Register.

Jan. 6th, 7th, 8th and 9th, 1948.—Quarterly and special meetings of Council, R.C.V.S., 10, Red Lion Square, W.C.1.

Jan. 14th, 15th and 16th, 1948.—Meetings of Committees and Council, N.V.M.A. Committees at 36, Gordon Square, W.C.1, Council (16th) at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2.

Feb. 19th and 20th.—Special meetings of Council, R.C.V.S., 10, Red Lion Square, W.C.1.

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N.V.M.A. Pension and Family Provision Scheme

An attractive new booklet describing the benefits which can now be secured under this scheme has just been published. Copies can be obtained by members free and without obligation, on stating their date of birth, from the Official Insurance Brokers for the Scheme, Messrs. Walter Herriot & Company, Ltd., Lloyd's Building, Leadenhall Street, London, E.C.3.

From the popularity of this successful scheme, which is administered by one of the leading insurance companies, it is already evident that a high proportion of N.V.M.A. members will receive retirement pensions, whilst the dependents of various deceased members are already in receipt of benefits under the generous Family Provision Section of the scheme.

This comprehensive booklet also explains how a joint pension with one's wife may be taken, if desired, and sets out the alternative monthly contributions required for retirement pensions to commence either at age 60 or 65.

Mr. L. Guy Anderson, President of the Association, in a foreword to this edition, points out that "The scheme not only meets the needs of the member on retirement, but also fully protects his family in the event of premature death. The specially advantageous terms are only available to members of the Association and it is the sincere conviction of the Council that the members are being offered an excellent scheme at a reasonable cost."

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Departmental Committee on Witnesses' Allowances Order

The following reply has been received to an enquiry addressed by the Association to the Home Office as to whether the recommendations contained in the Report of the above Committee have been adopted and, if so, from what date they take effect:—

Home Office,
Whitehall.
November 25th, 1947.

Sir,

I am directed by the Secretary of State to refer to your letter of the 19th instant, and, in reply, to say that the recommendations made by the Departmental Committee on the Witnesses' Allowances Order have not yet been adopted. The Report of the Committee is receiving consideration and it is hoped that a revised Witnesses' Allowances Order will be issued in the near future.

I am, Sir,
Your obedient Servant,
J. B. Howard.

The General Secretary,
National Veterinary Medical Association,
36, Gordon Square, W.C.1.

PERSONAL

Marriage.—Hartley—Wootten.—On November 22nd, 1947, at St. Saviour's Church, Walton Street, London, W.1, Richard Wentworth Hartley, M.R.C.V.S., only son of Mrs. Anne Hartley and the late Rev. J. S. Hartley, of Pendower, Cornwall, to Anne, eldest daughter of Major-General Wootten and Mrs. V. Wootten, of 8, Little Chester Street, London, W.1.

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Births.—Ottaway.—On December 1st, 1947, at 9a, de Freville Avenue, Cambridge, to Grace, wife of C. W. Ottaway—a sister for Mark and Richard.

Pearson.—On November 12th, 1947, to Norah (*née* Irwin), wife of J. K. L. Pearson, B.Sc., M.R.C.V.S., 14, Greenwood Park, Belfast—a son.

Woodford.—On November 21st, 1947, at Moorfields, Evershot, Dorset, to June (*née* Hindmarch), wife of M. H. Woodford, M.R.C.V.S.—a daughter.

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Mr. H. A. Crawshaw's R.C.V.S. Fellowship Diploma.—Mr. Horace Arthur Crawshaw, recently retired from the Colonial Veterinary Service, Bechuanaland Protectorate, and now in practice at 28, Stoke Road, Guildford, has been awarded a Fellowship Diploma by the Royal College of Veterinary Surgeons for a thesis entitled "Some Aspects of the Therapeutic, Prophylactic and Toxic Action of Phenanthridinium 1553 in the Bechuanaland Protectorate."

Ph.D. for Mr. W. B. McAleer.—At the meeting of the Senate held in Trinity College, Dublin, on October 22nd, the degree of Ph.D. was conferred upon Mr. William Burke McAleer, M.R.C.V.S., D.V.S.M., Lecturer in Physiology and Biochemistry, Royal Veterinary College of Ireland.

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R.C.V.S. OBITUARY

Tonar, Frederick, 2, Oxford Row, Lansdown Road, Bath, Somerset. Graduated Edinburgh, July 21st, 1886. Died November 23rd, 1947; aged 84 years.

Mr. Frederick Tonar, M.R.C.V.S.

His West Country colleagues, in particular, will mourn the loss of Mr. Frederick Tonar, who, for over 50 years, was one of the best known practitioners in Bath and district. He had been in ill health for some time and passed away on Sunday last at the Forbes Fraser Hospital, Bath, at the age of 84.

A native of Exeter, Mr. Tonar went to Bath in 1894 and built up an extensive practice, which he carried on till his retirement ten years ago, at the premises in Lansdown Mews, which are now occupied by Mr. John Storey, M.R.C.V.S.

He was honorary veterinary surgeon to many organizations, and he was a genial and familiar figure at countless horse and agricultural shows.

His wife died two years ago. There are no children.

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The Late Mr. Oscar Stinson, M.R.C.V.S.

In our last issue we paid preliminary tribute to the outstanding work done by the late Mr. Oscar Stinson in the field of bovine surgery and obstetrics.

Graduating from the Royal Veterinary College, London, in 1910, in the following year Oscar Stinson entered into partnership with Mr. Bray at Marden, Kent. Four years later he took over the practice at Kendal, Westmorland, where he remained until, at the end of 1921, he went to Appleby—with which centre of rural practice his name will always be associated.

During his days in practice, Oscar Stinson was regarded as a pioneer in bovine surgery; in particular, the developments he introduced in connection with operative work on the teat brought him lasting renown. The instrument (which bears his name) for enlarging the sphincter is in common use, and another, recently designed by him for operations on the teat, was exhibited at the recent Edinburgh Congress; indeed, his interest in this branch of surgery never waned. Many will remember his masterly demonstrations at earlier congresses, where he was also a valued contributor to the discussion of bovine subjects. Here his interest extended into the realm of veterinary medicine, where he had to his credit much helpful research into calcium and magnesium deficiencies and their relation to post-parturient dyspepsia.

In 1936 Mr. Stinson took up an appointment with the Westmorland County Council and continued until the transfer in April, 1938, when he joined the staff of the Ministry of Agriculture and Fisheries. During the latter part of his service with the Ministry, he was seconded for work in connection with the Hill Sheep Advisory Service, in which he took a keen interest.

A colleague in the Ministry writes of him: "It is true to say that Oscar Stinson's life's work was devoted to veterinary science. He did not appear to have any hobbies, unless, of course, it could be said that his work was a hobby."

. . . . .

An Appreciation

Mr. G. B. B. Howat, M.R.C.V.S., of Halesworth, Suffolk, writes: "It was only for the last few years of his life that I knew Oscar Stinson. This short time, however, was sufficient to reveal his charming personality. He was a man of retiring disposition, but possessed of great moral courage and fortitude.

"During the time he was in practice at Appleby he built up a reputation as a most skilful veterinary surgeon both amongst his clients and in the profession. He was also much respected for his high standard of conduct and is still well remembered over a wide area.

"Although he gave up private practice over ten years ago, he maintained a lively interest in all things connected with veterinary practice and was always very willing to give help and advice to all who sought it.

'In his death at a comparatively early age the profession loses a very fine veterinary surgeon and those who knew him, a good and kind friend."

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Intercollegiate 'soccer.—On November 8th, in London, the Liverpool University Veterinary School continued their run of victories this term by defeating the Royal Veterinary College by four goals to one. In advising us of this result and also of the projected return games at Liverpool in February by the R.V.C. and the "Dick" College, our informant adds: "We are finding these football games are helping to bind the students of the different colleges more closely together—on the field of sport as well as at the committee tables of the Association of Veterinary Students."

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At a meeting of the Farmers' Club held in London on Monday last, Sir Patrick Gower was elected Chairman. He was Private Secretary to three successive Prime Ministers from 1922 to 1928, Mr. Bonar Law, Mr. Baldwin and Mr. Ramsay MacDonald.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Oxfordshire.—Darkwood Farm, Park Corner, Swyncombe, Oxon. (Nov. 24th).

Sheep Scab:

Denbighshire.—Gellcoed Usha, Llangwm, Corwen (Nov. 24th).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents should write as briefly as possible and letters should not exceed 350 words.

UMBILICAL HERNIA IN THE BOVINE

Sir,—The following are extracts from a correspondence on the above subject which I consider to be of interest to the profession and to the stock-breeding community. The animal concerned was a young bull out of a recently imported cow.

Myself to the local veterinary surgeon.—I think before we do anything in this matter you should put the contents of this letter before the owner.

What would be the decision of the Ministry of Agriculture if a bull ten months old, affected with umbilical hernia, were presented for a licence? My belief is that the licence would be refused and the only rational reason for so doing would be the belief that the lesion was an hereditary defect.

If by operation we disguise the fact that this bull has had a hernia, what will be the position when the time arrives for licensing? The owner must surely divulge that the bull has been operated on for hernia. He might not feel disposed to do so; I know of no law compelling him. Yet I would be serving the agricultural community a bad purpose by disguising the defect, particularly as there is a possibility in view of the animal's high pedigree that he will be widely used.

Thus I would regard it as my duty if I operated to notify the Ministry of Agriculture of the fact. While it will probably be very unpalatable advice, I think we should advise that the animal be castrated.

Myself to the local veterinary surgeon.—With regard to the bull calf with umbilical hernia, I have received your message quoting the extract from the Ministry of Agriculture's letter (with which, may I say? I profoundly disagree). In view of the Ministry's decision I regard it as our duty to carry out the owner's wishes.

Ministry of Agriculture to veterinary surgeon.—Improvement of Livestock (Licensing of Bulls) Act, 1931. I am directed to refer to your letter of July 4th about your client's bull, and to inform you that an umbilical hernia would not in itself preclude the animal from being licensed under the above-mentioned Act, provided that the hernia is reduced and does not interfere with the bull's ability to serve.

* * * * *

I duly operated on the bull.

This morning I have been consulted regarding another young bull of the same breed with a large umbilical hernia and the owner tells me that the licensing officer informs him that while the animal will not be given a licence as he is, he will be given one if successfully operated on.

Yours faithfully,
J. G. Wright.

University of Liverpool School of Veterinary Science,
Veterinary Field Station,
Neston, Wirral.
November 21st, 1947.

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POLIOMYELITIS AND VIRUS DISEASE OF DOGS

Sir,—Having read all the correspondence in connection with the above article by Major Hamilton Kirk, and while appreciating his point of view, I personally hold to Mr. R. H. Smythe's contention that there is not the remotest likelihood of any connection between our "mysterious disease" of dogs and poliomyelitis in the human, except perhaps inasmuch as viruses tend to work in conjunction, e.g., persons immunized against smallpox sometimes develop "shingles."

Certainly we have been witnessing a virulence among the virus diseases of dogs, distemper included, which is abnormal and more widespread than of recent years, but as these conditions appear to present themselves in cycles they will no doubt abate in due course. Like R. H. Smythe and probably many others I have had a considerable number of cases of encephalomyelitis, or call it what you will, arising in dogs and horses, where children have been among the occupants; also I know of dogs in homes in which children have been stricken with "polio" but in neither of these two instances is there any evidence of transmissibility.

Yours faithfully,
E. G. Wood.

12-16, Bread Street,
Edinburgh, 3.
November 22nd, 1947.

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CHANGE OF NAME OF THE ASSOCIATION

Sir,—I have just received my copy of *The Veterinary Record* dated September 27th, in which is included a report of discussions which took place at the 65th Annual General Meeting of the N.V.M.A., on the subject of changing the name of the Association.

When so many urgent problems confront us, this annual display of weak indecision has ceased to be amusing. As far as I, an Irishman, can see the position, through the fog of irrelevant argument, and from the damp mists of the Irawaddy Delta, a majority vote has decided on the change of name to the "British Veterinary Association." This seems a sensible, concise name embracing branches of the Association in all parts of the British Commonwealth of Nations.

Do our Irish friends and colleagues maintain that they are of the same "Nation" as Englishmen, Scotsmen and Welshmen? Do not "nationals" of our African Colonies and Dominions, of the Dominions of India, Pakistan, and New Zealand, Sinhalese and Jamaicans, all consider themselves British?

Eire, for all that she does not acknowledge fealty to the King, is still a member of the British Commonwealth of Nations. The word "British" is, obviously, a much wider and all-embracing term than the word "National."

A disastrous war has just been concluded in which the majority of members of that Commonwealth have toiled in ". . . blood, sweat and tears," one of the main causes of which was narrow-minded nationalism forcing its ideologies on the rest of the world.

The majority of members of the N.V.M.A. are proud of being British—whatever their race or creed: let us not hesitate to declare it in no uncertain voice, and let the democratic principle of implementing the wishes of the majority for the good of the majority be settled *this* year.

Yours faithfully,
A. R. Green, D.D.V.S.,
S.W. Circle, Burma.

Bassein, Burma.
November 12th, 1947.

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LOCUM TENENS

Sir,—I would like to make use of your journal to outline a scheme for organizing locum tenens, which may be of value to the profession.

The reasons for a veterinary surgeon being away from his practice can be classified as follows:—

(1) Holidays or business.

The first is just as necessary for the veterinary profession as for any other profession; also the practitioner may have some business or meeting to attend which necessitates his absence for a few days.

(2) Health reasons.

There are several risks, connected directly or indirectly with his duties, and there are probably several occasions when he has to keep working, even when ill, to the detriment of his health, so that his practice may not suffer, when a few days in bed would have benefited him greatly.

This is the class that would gain most from the scheme, as the former has the advantage of being able to plan ahead.

In the scheme:—

Staff.—These could be selected from the new graduates at the five colleges, the number to be fixed by the demand, and would serve a fixed period, say a year.

Disposition.—The selected graduates would be centred at the colleges and serve the appropriate areas, and when not away on duty could be employed in the college on post-graduate or other work set by the college authorities.

Salaries.—The salaries for these locum tenens could be met out of a fund contributed to by the practitioners engaging in the scheme, and in a way would be an insurance for them.

Benefits.—The benefits to the locum tenens are many, as in this way he would gain wider experience of the various branches of practice, and at the end of his term of service would have a better idea of what he wanted to do.

The practitioner would gain in that he would be able to obtain a qualified locum tenens at short notice.

I realize, of course, that there are drawbacks to this plan, but still maintain that something on these lines could be carried out.

Yours faithfully,
R. G. Halcrow, M.R.C.V.S.

"Meadowside,"
Priory Road,
Carisbrooke, Isle of Wight.
November 4th, 1947.

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V.V.B.F. CHRISTMAS APPEAL

Sir,—I hardly like again to trespass on the generosity of *The Veterinary Record*, but I should be extremely grateful if you could publish the following extract from a letter just received, in answer to the Christmas Fund appeal which you so kindly published.

The letter is from an M.R.C.V.S. living in the British Isles who wishes to remain anonymous, and reads as follows:—

"I am desirous of making a contribution to the above Fund and, while it would be easier for me to send a donation in money, I feel perhaps a fowl would be appreciated by some of the recipients on your list, and would be willing to post direct to any number up to eight, if you would send me addressed labels."

This is such a grand gesture that I feel sure if it is brought to the notice of the profession, there would be many who would like to follow the idea of sending food parcels instead of money, however small that parcel may be.

With this in mind I will be only too pleased to send addressed labels to anyone desirous of sending such a parcel, if they will communicate with me, and will undertake to see that the most deserving will receive such parcels.

Yours faithfully,
P. J. Simpson,
Hon. Secretary.

Victoria Veterinary Benevolent Fund,
10, Red Lion Square, London, W.C.1.
November 28th, 1947.

Advertisers' Announcement

Change of Address.—Burroughs Wellcome & Co. announce that from *Monday, December 15th*, the address of their Veterinary Department will be changed to 183-193, Euston Road, London, N.W.1 (Telephone: EUSton 4477). Practitioners are asked to send enquiries and orders to this address in future.